In the claims:

Claim 1 (currently amended) An apparatus for implanting ions in an aluminum alloy ~~part~~ element (5), comprising a source (6) for delivering ions accelerated by an extraction voltage, and a first adjusting means (7-11) for adjusting an initial beam (fl') of ions emitted by said source (6) into an implantation beam (fl), ~~characterized in that~~ wherein said source (6) is an electron cyclotron source producing multi-energy ions that are implanted in the ~~part~~ element (5) at a temperature below 120°C , the implantation of the multi-energy ions from the implantation beam (fl) being effected simultaneously at a depth controlled by the extraction voltage of the source.

Claim 2 (currently amended) The apparatus as in claim 1, ~~characterized in that~~ wherein it further comprises a second adjusting means (1, 4, 12) for adjusting the relative positions of the ~~part~~ element (5) and the ion source (6).

Claim 3 (currently amended) The apparatus as in claim 2, ~~characterized in that~~ wherein the second adjusting means (1, 4, 12) ~~comprise~~ comprises ~~a part~~ an element holder ~~that is~~ (12) movable ~~(12)~~ so as to displace the ~~part~~ element (5) during its treatment.

Claim 4 (currently amended) The apparatus as in claim 3, ~~characterized in that~~ wherein the ~~part~~ element holder (12) is equipped with cooling means (13) to evacuate the heat generated in the ~~part~~ element (5) during the implantation of the multi-energy ions.

Claim 5 (currently amended) The apparatus as in ~~any one of preceding claims~~ claim 1 wherein, ~~characterized in that~~ the first adjusting means (7-11) for adjusting the ion beam ~~comprise~~ comprises a mass spectrometer (7) for sorting the ions produced by the source (6) according to their charge and mass.

Claim 6 (currently amended) The apparatus as in ~~any one of the preceding claims, characterized in that~~ claim 1 wherein the adjusting means (7-11) for adjusting the initial ion beam (fl') further ~~comprise~~ comprises optical focusing means (8), a profiler (9), a current transformer (10) and a shutter (11).

Claim 7 (currently amended) The apparatus as in ~~any one of the preceding claims, characterized in that~~ claim 1 wherein it is confined in an enclosure (3) equipped with a vacuum pump (2).

Claim 8 (currently amended) The apparatus as in claim 3, ~~characterized in that~~ wherein the second adjusting means (1, 4, 12) for adjusting the relative positions of the ~~part~~ element (5) and the ion source (6) ~~comprise~~ comprises calculating means (1) for calculating said position on the basis of data related to the nature of the ion beam, the geometry of the part (5), the rate of displacement of the part holder (12) with respect to the source (6), and the number of passes already completed.

Claim 9 (currently amended) A process for treating an aluminum alloy by ion implantation employing an apparatus as in ~~any one of the preceding claims,~~

~~characterized in that~~ claim 1 wherein the multi-energy ion beam displaces relatively with respect to the ~~part~~ element (5) at a constant rate.

Claim 10 (currently amended) A process for treating an aluminum alloy by ion implantation employing an apparatus as in ~~any one of claims~~ claim 1 ~~to 8, characterized in that~~ wherein the multi-energy ion beam displaces relatively with respect to the ~~part~~ element (5) at a variable rate that takes into account the angle of incidence of the multi-energy ion beam with respect to the surface of the ~~part~~ element (5).

Claim 11 (currently amended) The ~~treatment~~ process ~~as in either~~ of ~~claims~~ claim 9 ~~and 10, characterized in that~~ wherein the multi-energy ion beam is emitted at a constant emission rate and constant emission energies.

Claim 12 (currently amended) The ~~treatment~~ process ~~as in either~~ of ~~claims~~ claim 9 ~~and 10, characterized in that~~ wherein the multi-energy ion beam is emitted at a variable emission energies controlled by the ion source (6).